S114_LE3_002

Statistics 114
Sample Third Long Examination TGCapistrano

I. DEFINITION OF TERMS. Express the definitional formula of the following concepts in terms of the following notations Population Data={X1, X2, …, XN}, Sample Data={X1, X2, …., Xn} and Sample Array={X(1), X(2),…,X(n)}.

1. population mean
2. population standard deviation
3. fourth central moment about the mean of the population
4. sample variance
5. sample median

II. FILL IN THE BLANKS.

1. The value of the first moment about the mean of any finite collection is always equal to _____.
2. For the percentiles to be interpretable, the level of measurement used must at least be_____.
3. If the mean of the sample data is 10 and if each observation in this sample is transformed by subtracting 3 to each one of them, then the value of the mean of the transformed data is_____.
4. If the variance of the sample data is 5 and if each observation in this sample is transformed by subtracting 3 to each one of them, then the value of the variance of the transformed data is_____.
5. If the coefficient of variation of the sample data is 50% and if each observation in this sample is transformed by dividing each one of them by 10, then the value of the coefficient of variation of the transformed data is _%.
6. In any sample, the percentage of all observations that are less than or equal to the first quartile is_____.
7. If the observations in a sample of size 74 are all distinct then the number of observations between the 2nd decile and the 60th percentile is _____.
8. If the observations in a sample of size 95 are all distinct then the number of observations larger than the third quartile is _____.
9. The median is equal to the _____ decile.
10. If the median is closer to the first quartile than it is to the third quartile then this indicates that the distribution is skewed to the _____.
11. The value of Pearson's second coefficient of skewness of the normal distribution is _____.
12. For a distribution that is skewed to the left, the value of its median is (larger than/smaller than/equal to) its mean.
13. The value of the coefficient of kurtosis of the normal distribution is _____.
14. If the excess of kurtosis of a distribution is 1.5 then the type of kurtosis of this distribution is_____.
15. The percentage of observations in a normal distribution whose values are within 2 standard deviations from the mean is _____.
16. According to the Bianayme-Chebyshev rule, the percentage of all observations whose values are within 2 standard deviations from the mean is at least _____% for any distribution.
17. Given the population data, the value of the constant c so that $\sum_{i=1}^{N}(X_i - c)^2$ is minimumis _____.
18. If we compute for the standard score, Zi, of each one of the observations, $X_1, X_2, \ldots, X_N$, in the population whose mean is □ and standard deviation is □, the value of the variance of the collection of all these standard scores, $\{Z_1, Z_2, \ldots, Z_N\}$ is _____.

19. Given the following data:

0.1	15.3	15.8	16.0	16.6	18.0	18.5	19.0	19.5	20.0
0.1	15.5	15.8	16.0	16.7	18.0	18.6	19.0	19.5	20.0
0.5	15.5	15.9	16.0	16.9	18.0	18.8	19.0	19.7	20.1
0.5	15.5	15.9	16.3	17.0	18.1	18.8	19.1	20.0	20.2
0.6	15.6	16.0	16.4	17.5	18.2	18.9	19.4	20.0	20.3

The value of the 20% trimmed mean is _____.

20. Given the following frequency distribution:

Class Interval	frequency
10 – 19	25
20 – 29	40
30 – 39	75
40 – 49	80
50 – 59	82
60 – 69	30

The 45th percentile class is _____.

III. Write all formulas used in solving the problems below.

1. Financial managers measure and compare the riskiness of competing portfolios of investments. Suppose that two stocks, A and B, are being considered. The investors wish to choose that stock which show a less volatile price movements (that is, smaller fluctuations in market value). A sample of 20 days were selected and the daily closing prices (in dollars)of the two stocks were recorded on these days as follows:

Stock A:	.50	.51	.52	.55	.53	.55	1.50	1.75	1.25	0.75
	.80	.85	.83	.95	1.10	1.25	.95	.67	.99	1.00
Stock B:	5.50	5.51	5.52	5.55	5.53	5.55	6.50	6.75	6.25	5.75
	5.80	5.85	5.83	5.95	6.10	6.25	5.95	5.67	5.99	6.00

   a) Which stock must the investors choose? Compute for the appropriate statistic that will help the investors choose the stock with the smaller fluctuation in market value.
   b) Compute for the quartiles of the closing prices for Stock A.

2. In Metro Manila, the mean amount of a steak dinner is P550 with a standard deviation of P150. The mean amount for a chicken dinner is P250 with a standard deviation of P50. The mean amount for a lobster dinner is P750 with a standard deviation of 50. If a particular restaurant in Metro Manila charges P600 for a steak dinner, P350 for a chicken dinner and P800 for a lobster dinner, which of the three types of dinners is relatively most overpriced? Compute for the appropriate statistic that will answer the problem.

3. The travel expenditures (in pesos) of a sample of 12 employees of a company's sales department are as follows:

1730	3785	2550	4412	7330	6789	7595
8572	9580	9855	14347	20635		

Compute for the following summary measures:

a) mean
b) median
c) fourth decile
d) variance using the computational formula
e) unbiased estimator of oefficent of skewness based on the third central moment using the computational formula

4. Given the following sample data, compute for the 5% trimmed mean.

23	45	64	100	125	30	75	85	10	5
500	28	58	18	30	65	82	95	120	46
30	90	75	48	95	82	76	52	38	25
75	38	49	55	62	48	82	38	28	75

5. The following is the distribution of the social science achievement grades of a sample of college freshmen:

Achievement Grade	No. of Students
20 – 29	16
30 – 39	57
40 – 49	112
50 – 59	169
60 – 69	200
70 – 79	143
80 – 89	70
90 – 99	33

Approximate the following statistics:

a) mean
b) median
c) mode
d) standard deviation
e) third quartile
f) coefficient of variation

6. Show the derivation of the formula used to approximate the mode for grouped data. Show the location of this approximated value of the mode based on the frequency histogram.